REMARKS

Favorable reconsideration of the application is requested in view of the above amendments and the following remarks. Claims 1 and 4-25 are pending. No new matter has been added.

The Examiner objected to the drawings as informal and stated that Figure 8 should be relabeled. Figure 8 has been amended accordingly and formal drawings have been submitted, however no new matter has been added to the specification.

Claims 1-21 were objected to because of informalities. Although applicants disagree that the claims require amendment, they have amended the claims to expedite prosecution. No narrowing of the scope of the claims is intended by the claim amendments submitted herewith.

Claims 1-21 were rejected under the doctrine of obviousness-type double patenting as unpatentable over claims 1-7, 11-12, 17-19, 22-28, 31-33 and 39-42 of U.S. Patent No. 6,474,159 (Foxlin et al.) or claims 1-9 of U.S. Patent No. 6,681,629 (Foxlin et al.) in view of either JP 2001-103395 (Shinoda) or DE 19830359 (Zwosta). The Examiner stated that a timely filed terminal disclaimer may overcome this rejection.

Applicants note at the outset that although the Examiner relied on the Foxlin et al. '159 patent as a reference solely under the doctrine of obviousness-type double patenting, it may constitute prior art under 35 U.S.C. § 102(b) with respect to at least certain of the pending claims of the present application, which is a continuation-in-part of a continuation of the application that matured into the Foxlin et al. '159 patent. Accordingly, while the applicants have filed a terminal disclaimer together with this response, applicants further contest certain of the claim rejections as being non-obvious in view of the references cited by the Examiner.

The pending claims include independent claims 1, 14, 16, 17, 19, 21 and 22.

Claims 1-15 and 19-20

Claim 1 as amended is directed to a system for tracking the motion of an object relative to a moving reference frame, comprising a first inertial sensor mounted on the tracked object, a second inertial sensor mounted on the moving reference frame, a third inertial sensor mounted on the moving reference frame and spaced apart from the second inertial sensor, and an element coupled to said first and second and third inertial sensors and configured to determine a position of the object relative to the moving reference frame based on signals from the first and second and third inertial sensors, wherein the determination of the position of the object includes determination of at least one component of an angular acceleration of the moving reference frame and wherein the determination of the angular acceleration is made by combining linear acceleration data from the second and third inertial sensors. Claims 2-13 depend from claim 1.

Claim 14 as amended is directed to a system for tracking the motion of an object relative to a moving reference frame comprising a first inertial sensor mounted on the tracked object, a second inertial sensor mounted on the moving reference frame, a third inertial sensor mounted on the moving reference frame and spaced apart from the second inertial sensor, an element coupled to said first and second and third inertial sensors and configured to determine a position of the object relative to the moving reference frame based on signals from the first and second and third inertial sensors and a drift corrector for correcting inertial drift in a determined orientation of the object with respect to the moving reference frame, wherein the determination of the position of the object includes determination of at least one component of an angular acceleration of the moving reference frame and wherein the determination of the angular acceleration is made by combining linear acceleration data from the second and third inertial sensors. Claim 15 depends from claim 14.

Claim 19 as amended is directed to a system for tracking the motion of an object relative to a moving reference frame comprising a tracking inertial measurement unit mounted on the tracked object, three reference inertial measurement units mounted at three separated and non-collinear locations on the moving reference frame, an element coupled to said tracking inertial measurement unit and to said reference inertial measurement units and configured to determine an orientation and a position of the object relative to the moving reference frame based on signals from the inertial measurement units, and an element coupled to said reference inertial measurement units and configured to determine an angular acceleration of the moving reference frame based on the signals from the inertial measurement units. Claim 20 depends from claim 19.

In rejecting these claims, the Examiner stated:

> The instant application claims a first inertial sensor mounted on a tracked object; a second inertial sensor mounted on a moving reference frame; an element coupled to the sensor; and a drift corrector. The only difference between the prior art and the claimed invention is a third inertial sensor mounted on the moving reference frame spaced apart from the second inertial sensor. The references, Shinoda and Zwosta, teaches a plurality of inertial sensors mounted on a moving reference frame.... It would have been obvious to a person of ordinary skills in the art at the time of invention to have readily recognize [sic] the advantages and desirability of employing a third inertial sensor on the moving reference frame as suggested by the references of Shinoda and Zwosta to the apparatus of the Foxlin et al. reference to provide multiple output signals such that the orientation and position of the tracking object is more precise and accurate. Furthermore, to employing [sic] the third inertial sensor is a mere design expedient of duplicating parts for a multiplied effect.

Applicants first point out that claims 1, 14 and 19 as amended are all directed to systems for tracking the motion of an object relative to a moving reference frame. One feature that distinguishes these claims from the prior Foxlin et al. inventions is not merely the addition of a third inertial sensor on the moving reference frame, but also the use of signals (claim 19) or linear acceleration data (claims 1 and 14) from multiple inertial sensors on the moving reference

frame to determine an angular acceleration of the moving reference frame. No such techniques are taught or suggested in any of the references cited by the Examiner. Accordingly, claims 1, 14, and 19, and their respective dependent claims are patentable over the art of record.

Claims 16-18

Independent claims 16 and 17 are supported by the parent applications to the pending application. Accordingly, claims 16 and 17 should be allowable in view of the terminal disclaimer filed herewith. Claim 18 depends from claims 15-17, and is therefore allowable for the reasons those claims are allowable.

Claim 21

Claim 21 as amended is directed to a system for tracking the motion of an object relative to a reference frame, comprising an optical sensor for measuring a location of a target in an image plane, at least three light-emitting targets which emit invisible ultraviolet radiation which can be detected by the optical sensor but which does not interfere with night vision equipment, an element coupled to said optical sensor and configured to determine a position of the object relative to the reference frame based on locations of the ultraviolet targets in the image plane of the optical sensor.

Claim 21 is distinguishable from the prior Foxlin et al. inventions at least in calling for "at least three light-emitting targets which emit invisible ultraviolet radiation which can be detected by the optical sensor but which does not interfere with night vision equipment, an element coupled to said optical sensor and configured to determine a position of the object relative to the reference frame based on locations of the ultraviolet targets in the image plane of the optical sensor." Moreover, no such limitation is suggested in either Shinoda or Zwosta. Accordingly, claim 21 is patentable over the art of record.

Claims 22-25

New independent claim 22 is directed to a system for tracking the motion of an object relative to a moving reference frame, comprising a first inertial sensor mounted on the tracked object; a second inertial sensor mounted on the moving reference frame, a third inertial sensor mounted on the moving reference frame and spaced apart from the second inertial sensor, an element coupled to said first and second and third inertial sensors and configured to determine a position of the object relative to the moving reference frame based on signals from the first and second and third inertial sensors, and an optical measuring subsystem for making independent measurements related to the position of the object relative to the moving reference frame by measuring the location of one or more targets in the image planes of one or more sensors. New claims 23-25 depend from claim 22.

Claim 22 is distinguishable from the Foxlin et al inventions at least in calling for "an optical measuring subsystem for making independent measurements related to the position of the object relative to the moving reference frame by measuring the location of one or more targets in the image planes of one or more sensors." Moreover, no such limitation is suggested in either Shinoda or Zwosta. Accordingly, claim 22 and its dependent claims are patentable over the art of record.

Enclosed is a $150.00 check for excess claim fees and a $510.00 check for the Petition for Three Month Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050, referencing Attorney Docket No. 09970-012001.

Respectfully submitted,

Date: 3/29/05

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Amendments to the Drawings:

Applicants have amended Figure 8 to include drawing labels previously omitted, and formal drawings for all figures are herewith submitted. No new matter has been added.

Attachments following last page of this Amendment:

Formal Drawings (9 pages)
Annotated Sheet Showing Change(s) (1 page)

ANNOTATED SHEET (SHOWING CHANGES)
Page 1 of 1
Appln No.: 10/762,810
Applicant(s): Eric Foxlin et al.
MOTION-TRACKING

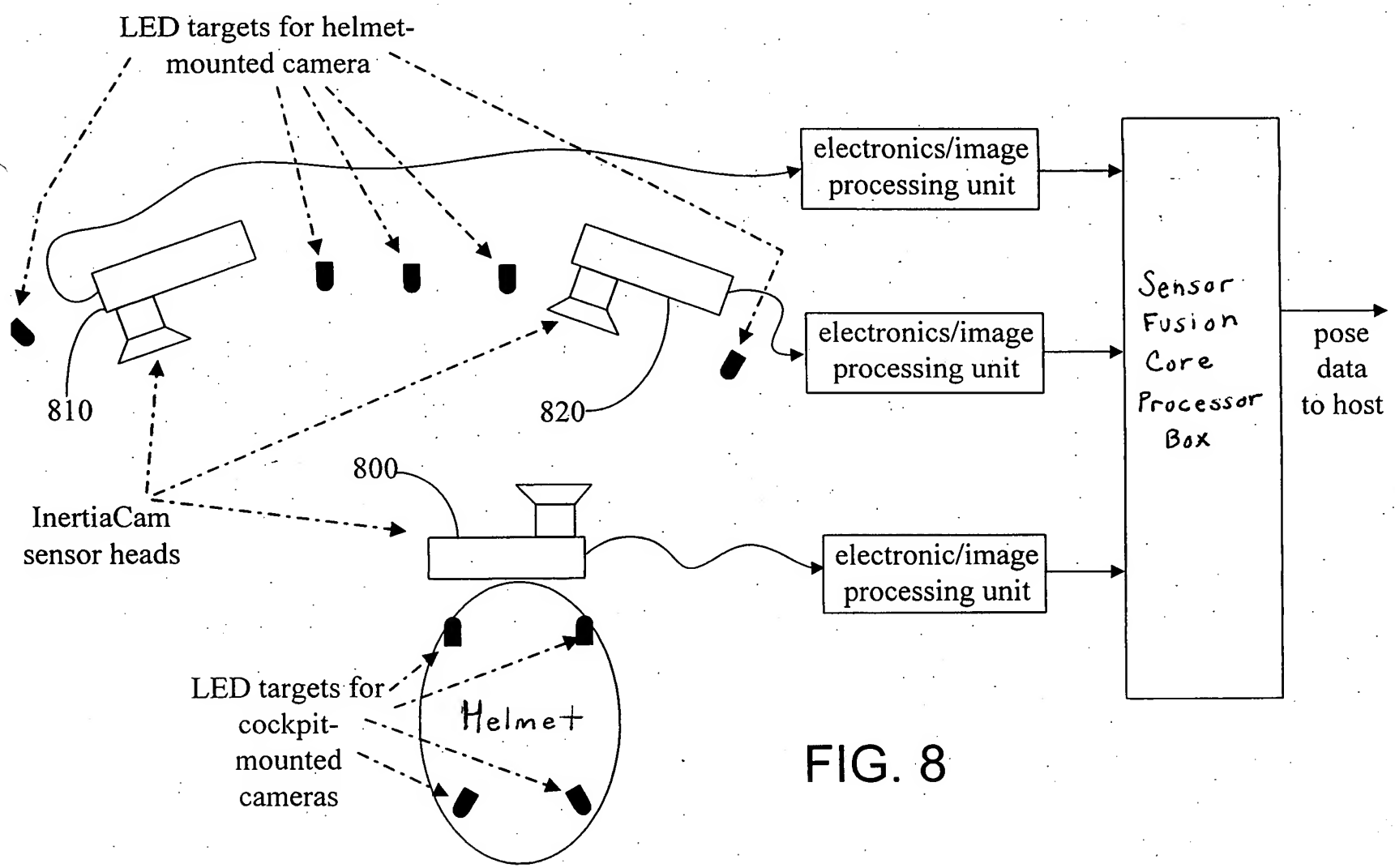

FIG. 8